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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,221	05/27/2005	Christian Joram	17346-0014	7211

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SUTHERLAND ASBILL & BRENNAN LLP
999 PEACHTREE STREET, N.E.
ATLANTA, GA 30309

EXAMINER

HANNAHER, CONSTANTINE

ART UNIT	PAPER NUMBER
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2884

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/521,221

Applicant(s)

JORAM ET AL.

Examiner

Constantine Hannaher

Art Unit

2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 15-19 and 21-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 20 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☒ Claim(s) 1-29 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>20050630</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 15-19 and 21-29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on November 27, 2006.
2. Applicant's election with traverse of the requirement for restriction in the reply filed on November 27, 2006 is acknowledged. The traversal is on the ground(s) that there is not an undue burden. This is not found persuasive because "undue burden" is of no relevance under a unity of invention analysis.

The requirement is still deemed proper and is therefore made FINAL.

Priority

3. Note: a national stage application filed under 35 U.S.C. 371 may not claim benefit of the filing date of the international application (of which it is the national stage) since its filing date is the date of filing of that international application. See also MPEP § 1893.03(b). Stated differently, since the international application is not an earlier application (it has the same filing date as the national stage), a priority claim in the national stage to the international application is inappropriate.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the wires of claim 11 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be

labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Note the use of "The invention relates to..." The requirement for a concise abstract is found in PCT Rule 8.1(b).

6. The disclosure is objected to because of the following informalities: page 8, line 33, handwriting, PCT Rule 11.9(a).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 13 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites the limitation "said segments" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 14 establishes segments for the crystals, but claim 1 and claim 10 do not establish segments for the detectors.

Claim 12 recites the limitation "said wires" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 11 establishes wires, not claim 1.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claim 1 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Yamashita *et al.* (US004823016A).

With respect to independent claim 1, Yamashita *et al.* discloses a detector module (Fig. 1) for positron emission tomography (column 1, lines 9-13) comprising a matrix 12 of scintillator crystals 12, and having the recited configuration (column 4, lines 9-14), a first light sensitive detector 11 connected as recited and of the recited type (column 4, lines 5-6), and a second light sensitive detector 11 connected as recited and of the recited type (Fig. 2, column 4, lines 30-33).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita *et al.* (US004823016A) in view of Derenzo (US004672207A).

With respect to dependent claim 2, the light sensitive detectors **11** in the module of Yamashita *et al.* are segmented (Fig. 7) but no particular association between segments and scintillator crystals is disclosed. Derenzo teaches a matrix **12** of scintillator crystals **13** and a light sensitive detector **14** which is segmented (photodetectors **15**) such that at least one segment **15** in the detector **14** corresponds to each scintillator crystal **13** in the matrix **12** (Fig. 1). In view of the improved association of the light from each scintillator crystal to a specific photodetector as suggested by Derenzo (column 3, lines 30-38), it would have been obvious to one of ordinary skill in

the art at the time the invention was made to modify the module of Yamashita *et al.* such that the segments in the detectors **11** corresponded to the crystals in the matrix **12**.

With respect to dependent claim 3, the segmentation suggested by Derenzo has the detectors **15** matching the pattern of the side of the matrix **12**.

14. Claims 4, 5, 9, 10, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita *et al.* (US004823016A) in view of Ramsden (US 20040200966A1).

With respect to dependent claim 4, the first light sensitive detector **11** in the module of Yamashita *et al.* is a photomultiplier. Ramsden teaches a detector module **20** (Fig. 2) for PET (paragraph [0041]) comprising a matrix **22** of scintillation crystals and a light sensitive detector **26**. The detector of Ramsden is a Multi-pixel Hybrid Photodiode. In view of the improved readout speed described by Ramsden (paragraph [0045]) it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the module of Yamashita *et al.* to replace the photomultiplier **11** with a hybrid photodiode detector.

With respect to dependent claim 5, see the rejection of claim 4.

With respect to dependent claim 9, Yamashita *et al.* leaves the choice of crystal material to those of ordinary skill in the art (column 4, lines 10-11). Ramsden teaches that the recited composition is known for scintillator crystals in a matrix (paragraph [0041]). Cerium doping is so well known as to require no citation. In view of the suitability for inclusion in a PET detection module as suggested by Ramsden, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify LSO:Ce as the material of the scintillator crystals in matrix **12** in the module of Yamashita *et al.*

With respect to dependent claim 10, Yamashita *et al.* suggests dimensions of $3 \times 5 \times 50 \text{ mm}^3$ for the scintillator crystals **12** (column 4, line 51). Ramsden suggests dimensions of $2 \times 2 \times 10 \text{ mm}^3$

for the scintillator crystals in matrix 54 (paragraph [0056]). The size of the crystals is a choice within the ordinary skill in the depending on the desired performance, as Ramsden suggests a square cross-section, Yamashita *et al.* discloses a range of dimensions for the cross-section encompassing the recited dimensions, and it would have been obvious to one of ordinary skill in the art at the time the invention was made to lengthen the crystals to evaluate more patient slices.

With respect to dependent claim 13, as best understood, the segments of the light detectors suggested by Ramsden are slightly larger than the light guides (paragraph [0060]). In view of the direct coupling taught by Yamashita *et al.* it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the size of the segments be slightly larger than the cross-sectional size of the crystals 12 for the best association of light from each crystal with a segment. Note that a spacing between crystals 12 is disclosed by Yamashita *et al.* (column 4, lines 27-29).

15. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita *et al.* (US004823016A).

With respect to dependent claim 6, the matrix 12 in the detector module of Yamashita *et al.* has a pattern as recited (Fig. 1) and the size is a choice within the ordinary skill in the art depending on the desired performance.

With respect to dependent claim 7, the number of crystals 12 in the detector module of Yamashita *et al.* is a choice within the ordinary skill in the art depending on the desired performance.

16. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita *et al.* (US004823016A) in view of Belcari *et al.* (2001).

With respect to dependent claim 8, Yamashita *et al.* leaves the choice of crystal material to those of ordinary skill in the art (column 4, lines 10-11). Belcari *et al.* teaches that the recited

composition is known for scintillator crystals in a matrix. In view of the suitability for inclusion in a PET detection module as suggested by Belcari *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify YAP:Ce as the material of the scintillator crystals in matrix **12** in the module of Yamashita *et al.*

17. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita *et al.* (US004823016A) in view of Such *et al.* (US006661012B2).

With respect to dependent claim 11, Yamashita *et al.* discloses a spacing between crystals **12** (column 4, lines 27-29). Such *et al.* teaches that the stringing of wires **21**, **22** between scintillation crystals **23** in a matrix (Fig. 2) is known (column 4, lines 50-60). In view of the improved precision of crystal placement as described by Such *et al.* (column 3, lines 12-13) it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the module of Yamashita *et al.* to further comprise wires strung between the scintillator crystals **12** to precisely position the faces of the matrix in association with the position sensitive detectors.

With respect to dependent claim 12, as best understood, the size of the wires suggested by Such *et al.* is a choice within the ordinary skill in the art (column 2, lines 63-65).

18. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita *et al.* (US004823016A) in view of Soluri (WO98/50801A2).

With respect to dependent claim 20, Soluri teaches that it is known to use a detector module (Fig. 1) comprising a matrix **2** of scintillator crystals and a position sensitive light sensitive detector **4** for either PET or SPECT (abstract). Accordingly, it would have been obvious to take the photon detector of Yamashita *et al.* and incorporate the module in a SPECT detector since the advantages of detecting the three dimensional absorption position would be useful in such measurements.

Allowable Subject Matter

19. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

20. The following is a statement of reasons for the indication of allowable subject matter: although the use of glues of a matched refractive index between a scintillator and a light guide is known, extending the length of a crystal is not suggested.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (571) 272-2437. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ch


Constantine Hannalor
Primary Examiner